

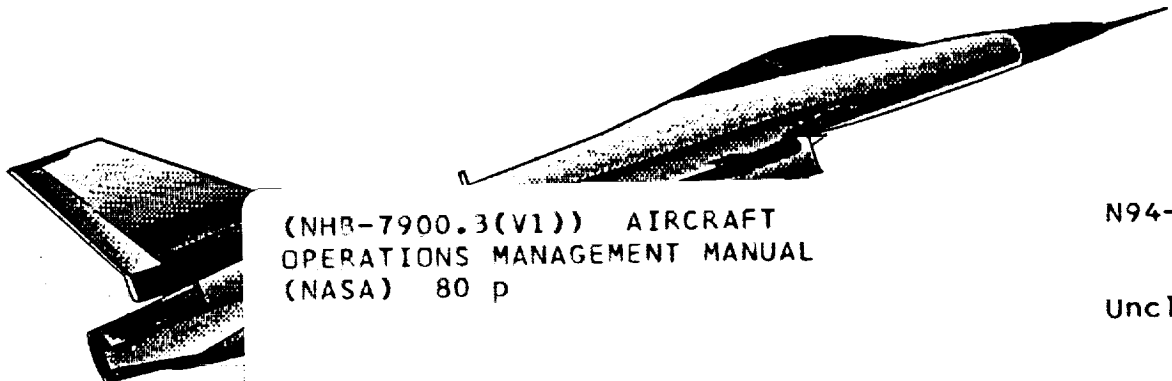
**National Aeronautics  
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# **Aircraft Operations Management Manual**

## **NHB 7900.3 (V1)**



**(NHB-7900.3(V1)) AIRCRAFT  
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(NASA) 80 p**

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ORGANIZATION OF THE NASA AIRCRAFT OPERATIONS  
MANAGEMENT MANUAL

EFFECTIVE DATE:  
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This Manual is issued in loose leaf form and revised by page changes. Field Installation management has the option of adding supplements to this Manual. Copies of the field supplements will be provided to the Chief, Aircraft Management Office, for review and, if appropriate, distribution to other users of this Manual.

Comments and questions concerning this Manual should be addressed to the Chief, Aircraft Management Office, Code JIF, NASA Headquarters, Washington, DC 20546.

This Manual cancels the following NASA Management Instructions (NMI's): NMI 7900.1C, dated December 16, 1991; NMI 7910.1C, dated December 16, 1991; NMI 7910.2A, dated December 13, 1991; NMI 7910.3A, dated December 16, 1991; and NMI 7920.1B, dated December 16, 1991.

  
Director, Logistics, Aircraft,  
and Security Division

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**NASA HANDBOOK 7900.3 (V1)**  
**AIRCRAFT OPERATIONS MANAGEMENT**

**TABLE OF CONTENTS**

<u>Par.</u>	<u>Page</u>
<b>INTRODUCTION.....</b>	<b>ix</b>
<b>APPLICABILITY.....</b>	<b>ix</b>
<b>RELATED DIRECTIVES.....</b>	<b>ix</b>
<b>CHAPTER 1 - AIRCRAFT OPERATIONS, GENERAL.....</b>	<b>1-1</b>
100. Purpose.....	1-1
101. Definitions.....	1-1
1. Aircraft Classification.....	1-1
a. Research and Development.....	1-1
b. Program Support.....	1-1
c. Mission Management.....	1-1
d. Inactive.....	1-1
2. NASA-Controlled Aircraft.....	1-2
3. NASA Aircraft Inventory.....	1-2
4. Acquisition.....	1-2
5. Disposition.....	1-2
6. Public Aircraft.....	1-2
7. Civil Aircraft.....	1-2
8. NASA Intercenter Aircraft Operations Panel...	1-2
102. Operations Policies.....	1-2
103. Assignment of Authority and Responsibility.....	1-3
1. The Associate Administrator for Management Systems and Facilities.....	1-3
2. Institutional and Program Associate Administrators.....	1-3
3. Directors of Field Installations.....	1-4
4. Chief, Aircraft Management Office.....	1-4
104. Acquisition and Disposition of Aircraft.....	1-4
1. The Associate Administrator for Management Systems and Facilities.....	1-4
2. The Program Offices.....	1-5

3.	The Director, Defense Affairs Division.....	1-5
4.	The Aircraft Management Office.....	1-5
5.	Directors of Field Installations.....	1-5
 <b>CHAPTER 2 - NASA AIRCRAFT OPERATIONS GUIDELINES.....</b>		<b>2-1</b>
200.	Purpose.....	2-1
201.	Operations.....	2-1
1.	Flight Authorization.....	2-1
2.	NASA Aircraft Use.....	2-1
3.	Pilot Assignments for NASA Aircraft.....	2-1
4.	Documentation.....	2-2
202.	Flight Crews.....	2-2
1.	Pilot Proficiency Evaluation Program.....	2-2
2.	Aviation Medical Program.....	2-3
3.	Alcohol and Drugs.....	2-4
4.	Pilot Release from Flight Status.....	2-4
 <b>CHAPTER 3 - MISSION MANAGEMENT AIRCRAFT OPERATIONS.....</b>		<b>3-1</b>
300.	Purpose.....	3-1
301.	Policy.....	3-1
302.	Approval of Flights.....	3-1
303.	Mission Management Aircraft Responsibilities.....	3-2
1.	The Associate Administrator for Management Systems and Facilities.....	3-2
2.	Institutional and Program Associate Administrators.....	3-2
3.	Installation Directors.....	3-2
4.	The Chief, Aircraft Management Office.....	3-3
5.	The Intercenter Aircraft Operations Panel (IAOP).....	3-4
304.	Coordination and Scheduling.....	3-5
305.	Operations.....	3-5
306.	Use of Program Support Aircraft for Mission Management Purposes.....	3-5

<b>CHAPTER 4 - AIRWORTHINESS AND SAFETY/FLIGHT READINESS</b>	
<b>REVIEW POLICY.....</b>	<b>4-1</b>
400. Purpose.....	4-1
401. Definitions.....	4-1
1. Aircraft.....	4-1
2. Aircraft Modification.....	4-1
3. Airworthiness.....	4-1
4. Flight Envelope.....	4-1
5. Hazard Analysis.....	4-1
6. Mission.....	4-1
402. Policy.....	4-1
403. Airworthiness Responsibilities.....	4-2
1. The Program Office Associate Administrators..	4-2
2. The Associate Administrator for Safety and Mission Quality.....	4-2
3. The Installation Directors.....	4-2
4. The Aircraft Management Office.....	4-2
404. Airworthiness and Safety/Flight Readiness Reviews.	4-2
405. Airworthiness and Maintenance Programs.....	4-3
406. Quality Assurance.....	4-4
407. Monitoring.....	4-4
408. Maintenance Manual.....	4-5
 <b>CHAPTER 5 - AVIATION SAFETY.....</b>	 <b>5-1</b>
500. Policy.....	5-1
501. Aviation Safety Responsibilities.....	5-1
1. The Administrator.....	5-1
2. The Associate Administrator for Safety and Mission Quality.....	5-1
3. The Director, Safety Division.....	5-2
4. The Associate Administrator for Management Systems and Facilities.....	5-3
5. The Aircraft Management Office (AMO).....	5-3
6. The Program Offices.....	5-4
7. The Aerospace Safety Advisory Panel (ASAP)...	5-5

8.	Field Organizations and Personnel.....	5-5
a.	Field Installation Directors.....	5-5
b.	Installation Aviation Manager of Flight Operations.....	5-5
c.	Pilot-in-Command.....	5-6
d.	Individuals.....	5-6
9.	All Aviation Supervisory Personnel.....	5-6
10.	Each NASA employee.....	5-6
502.	Aviation Safety Officer.....	5-6
503.	Aviation Safety Program.....	5-7
504.	Interfaces with Other Agencies.....	5-8
1.	Industry.....	5-8
2.	Department of Transportation.....	5-8
3.	Department of Defense.....	5-9
4.	Foreign Governments.....	5-9
 <b>CHAPTER 6 - INTERCENTER AIRCRAFT OPERATIONS REVIEW PROGRAM.....</b>		 6-1
600.	Purpose.....	6-1
601.	Responsibilities.....	6-1
602.	Procedures.....	6-1



## APPENDICES

APPENDIX A - AVIATION MEDICAL PROGRAM.....	A-1
APPENDIX B - ELEMENTS OF AN AVIATION SAFETY PROGRAM.....	B-1
A. Aircraft Mishap Prevention Survey.....	B-1
B. Aircraft Mishap Reporting and Investigation.....	B-1
C. Monthly Mishap Prevention Themes.....	B-1
D. Aviation Mishap Prevention Bulletin Board.....	B-1
E. The Aviation Safety Council.....	B-2
F. Aviation Safety Meetings.....	B-2
G. Incentives and Awards.....	B-3
H. Occupational Health, Medical Clearance, Emergency Egress, and Survival.....	B-4
I. Facilities.....	B-5
J. Cargo Safety.....	B-5
K. Dissemination of Aviation Safety-Related Material...	B-5
L. Aviation Safety Officer (ASO) Handbook.....	B-6
APPENDIX C - GUIDELINES FOR FIELD INSTALLATION AIRCRAFT MAINTENANCE MANUALS.....	C-1
APPENDIX D - NASA INTERCENTER AIRCRAFT OPERATIONS REVIEW AIRCRAFT MANAGEMENT OFFICE.....	D-1
APPENDIX E - INTERCENTER AIRCRAFT OPERATIONS REVIEW PLAN	E-1
APPENDIX F - AIRCRAFT MANAGEMENT OFFICE INTERCENTER AIRCRAFT OPERATIONS REVIEW CHECKLIST.....	F-1
A. Operations.....	F-1
B. Aviation Safety.....	F-8
C. Flight Readiness.....	F-10
D. Hazard Analysis.....	F-12
E. Facilities.....	F-13
F. Aircraft Maintenance.....	F-15
G. Quality Assurance (QA) and Inspection.....	F-17
H. Avionics, Instrumentation, Electronics, and Electrical.....	F-19
I. Maintenance Facilities.....	F-22
J. Maintenance Training.....	F-23
K. Accident Investigation Recommendations.....	F-24
APPENDIX G - AVIATION RELATED DOCUMENTS.....	G-1
APPENDIX H - ACQUISITION CHECKLIST.....	H-1



## AIRCRAFT OPERATIONS MANAGEMENT

### INTRODUCTION:

The NASA aircraft operations program is a multifaceted, highly diverse entity that directly supports the Agency mission in aeronautical research and development, space science and applications, space flight, astronaut readiness training, and related activities through research and development, program support, and mission management aircraft operations flights. Users of the program are interagency, intergovernment, international, and the business community. This Manual provides guidelines to establish policy for the management of NASA aircraft resources, aircraft operations, and related matters. This policy is an integral part of and must be followed when establishing Field Installation policy and procedures covering the management of NASA aircraft operations. Each operating location will develop appropriate local procedures that conform with the requirements of this Handbook. This Manual should be used in conjunction with other governing instructions, handbooks, and manuals.

### APPLICABILITY:

This Manual is applicable to NASA Headquarters and Field Installations.

### RELATED DIRECTIVES:

- a. NMI 1103.50, "Role and Responsibilities - Associate Administrator for Management Systems and Facilities."
- b. NMI 1152.47, "NASA Intercenter Aircraft Operations Panel."
- c. NMI 1152.59, "NASA Medical Boards in Support of Crew Qualification for Spacecraft and Aircraft Operations."
- d. NHB 1700.1(V1-A), "Basic Safety Manual."
- e. NMI 7900.2, "NASA Aircraft Operations Management -- Delegation of Authority."



## CHAPTER 1 - AIRCRAFT OPERATIONS, GENERAL

### 100. PURPOSE

This Chapter establishes general policies for the management of all NASA aircraft resources and related matters.

### 101. DEFINITIONS

For classification and requirement purposes, the following definitions apply:

#### 1. Aircraft Classification

- a. Research and Development - Those aircraft used primarily for research and development in aeronautics, applications, the study of the atmosphere, and space-oriented programs.
- b. Program Support - Those aircraft used primarily for direct support of NASA programs and projects including, but not limited to, such activities as astronaut space-flight readiness training, science applications, special-purpose cargo airlift, range surveillance, microgravity research, launch security, search and rescue, chase, support of tracking and remotely located sites, and pilot proficiency, including cross-country.
- c. Mission Management - Those aircraft used primarily to transport management and staff personnel to provide direction, coordination, and oversight in support of NASA's mission.
- d. Inactive - An aircraft:
  - (1) whose use in one of the classifications above has been completed and is in a non-operational status either with potential for future use or awaiting disposition;
  - (2) on loan from NASA; or
  - (3) used for spare parts; or
  - (4) acquired for future use.

2. NASA-Controlled Aircraft - Those aircraft owned by, bailed to, or leased to NASA or those aircraft for which NASA has the primary operating responsibility. Aircraft on loan from NASA will not be considered NASA-controlled aircraft unless so stated by agreement.
3. NASA Aircraft Inventory - All active NASA-controlled aircraft. Both active and inactive aircraft will be recorded on property control inventories.
4. Acquisition - Any means of bringing an aircraft under NASA control or into the property control inventory.
5. Disposition - Any means of deleting an aircraft from NASA control or from the property control inventory.
6. Public Aircraft - Aircraft used only in the service of a government or a political subdivision. It does not include military nor any government-owned aircraft engaged in carrying persons or property for commercial purposes.
7. Civil Aircraft - Aircraft other than public or military aircraft. Includes aircraft engaged in carrying persons or property for commercial purposes, such as air carrier, commuter, charter, and leased aircraft.
8. NASA Intercenter Aircraft Operations Panel (IAOP) - Established by NMI 1157.42 the IAOP is composed of members from Field Installations that operate aircraft, representatives from the Aircraft Management Office (AMO), advisors from appropriate Field Installations and the Office of Safety and Mission Quality, and points of contact from the Headquarters Program Offices.

## 102. OPERATIONS POLICIES

1. NASA normally will use commercially available service for air transportation of personnel and cargo. When requirements cannot be met effectively by commercial service or they exceed the existing capabilities of NASA-controlled aircraft, such requirements may be met by using other public or civil aircraft.
2. NASA will use its aircraft resources in an effective and efficient manner to conduct and support approved or planned programs and projects.

3. NASA management will continually appraise the requirements, use, and operating costs of all NASA-controlled aircraft.
4. NASA will maintain the highest level of airworthiness and aircraft operating standards. Only qualified and designated personnel will pilot NASA-controlled aircraft.
5. NASA-controlled aircraft are subject to Federal Aviation Regulations with respect to the use of airspace, the control of air traffic, and aircraft registration. Aircraft on loan from the Armed Forces are not subject to civil registration. NASA-controlled aircraft must secure diplomatic clearance approval prior to entry into the airspace of a foreign country.
6. Assignment of an aircraft to an Installation will be based on a determination that the assignment of the aircraft is in accordance with approved program plans or that it is needed to fulfill center roles and missions.

103. ASSIGNMENT OF AUTHORITY AND RESPONSIBILITY

The authority and responsibility to ensure the effective implementation of the stated policies are assigned as follows:

1. The Associate Administrator for Management Systems and Facilities will designate aircraft classifications and assign aircraft to the appropriate Field Installation. Assignments will be coordinated with the appropriate Institutional and Program Office Associate Administrators.
2. Institutional and Program Associate Administrators are responsible for:
  - a. Early coordination with the Office of Management Systems and Facilities in establishing program or project plans involving the acquisition, assignment, and/or operation of an aircraft.
  - b. Continually reviewing current aircraft requirements, use, and associated costs.
  - c. Assuring the effective management of aircraft operations at their respective Centers.

3. Directors of Field Installations are responsible for:

- a. Approving aircraft charters or leases for periods of 30 days or less.
- b. Providing authorization for personnel to operate or to fly in NASA aircraft under their control.

4. The Chief, Aircraft Management Office, will:

- a. Maintain, review, and update operational plans for employment of NASA aircraft.
- b. Review and evaluate the adequacy of Field Installation organizations, facilities, and procedures for aircraft operations and related activities using intercenter teams, as appropriate.
- c. Ensure that current information on the NASA aircraft fleet, operations, and related budget and cost data are maintained by NASA.
- d. Participate with Headquarters Program Offices and Field Installations in the assessment of aircraft operational requirements and plans to evaluate the adequacy of NASA aircraft resources to conduct necessary operations.
- e. Maintain liaison with other Government agencies and the private sector on matters pertaining to aircraft operations, maintenance, and management practices.
- f. Designate Headquarters personnel authorized to perform official flight duties.

104. ACQUISITION AND DISPOSITION OF AIRCRAFT

Acquisition of additional aircraft to meet Agency requirements will be in accordance with established Federal agency acquisition guidelines and initiated only after the following alternatives have been considered in the order stated: (1) Use of available NASA aircraft resources; (2) Use of public aircraft owned by other Government agencies through loan or transfer; (3) charter or lease of civil aircraft.

- 1. The Associate Administrator for Management Systems and Facilities will have the approval authority for aircraft acquisition requests that have been properly



coordinated with appropriate Institutional and Program Office Associate Administrators, the Offices of the General Counsel, the Chief Financial Officer (CFO)/ Comptroller, Legislative Affairs, and Policy Coordination and International Relations (if DOD related). He/she is also responsible for long-term aircraft leases.

2. The Program Offices will establish the need and funding for each aircraft assigned to support their programs and will continually review current aircraft requirements and associated costs.
3. The Director, Defense Affairs Division, will provide the interface between NASA and elements of the Department of Defense (DOD) as necessary for the effective coordination of matters relating to the acquisition of aircraft, spares, and equipment from DOD or to aircraft used in support of joint programs between NASA and DOD.
4. The Aircraft Management Office will develop for approval of the Associate Administrator for Management Systems and Facilities Agency policies governing the acquisition of NASA-controlled aircraft. These policies will comply with Office of Management and Budget (OMB) guidelines. They will act as the Field Installation aircraft operations focal point and will coordinate the Headquarters review and perform a technical assessment and evaluation of proposed acquisitions, classifications, assignments, and dispositions of NASA aircraft.
5. Directors of Field Installations are responsible for the acquisition of aircraft used solely as wind tunnel or other non-flyable test models. They are also responsible for submitting to and coordinating with the Associate Administrator for Management Systems and Facilities all aircraft acquisition and disposition requests through cognizant Institutional and Program Office Associate Administrators.
6. Aircraft obtained solely for spare parts or for future programs are subject to the aircraft acquisition process. Such aircraft will not be recorded as part of the NASA aircraft inventory. Any subsequent action to assign an inactive aircraft to active flight status will require separate approval.

7. A NASA-controlled aircraft will be disposed of when it is excess to the current and anticipated needs of the Agency. Disposal of NASA-owned aircraft will be in accordance with Federal Property Management Regulations, unless otherwise specifically authorized. See NHB 4300.1, "NASA Personal Property Disposal Manual."

## CHAPTER 2 - NASA AIRCRAFT OPERATIONS GUIDELINES

### 200. PURPOSE

This Chapter establishes overall policy guidelines for NASA-controlled aircraft operations, flight crew requirements, and the Aviation Medical Program.

### 201. OPERATIONS

1. Flight Authorization. Procedures will be established to ensure that all flights of NASA aircraft are approved by a supervisory aircraft operations pilot, or other appropriate aircraft operations supervisory authority. A documented and approved process to cover absences of flight approval authorities will be implemented.
2. NASA Aircraft Use. NASA aircraft will be used primarily for research and development, program support, astronaut space flight readiness training, and mission management flight activities to accomplish established and approved or planned NASA objectives. Other authorized flight activities are:
  - a. Proficiency flying, including cross-country, to meet currency and annual requirements, which is a recognized necessary element for safety in aircraft operations.
  - b. Maintenance checks and/or ferry flights.
  - c. Logistics support (excluding experimental aircraft).
  - d. Emergency and humanitarian operations.
  - e. Limited use of program support aircraft for mission management purposes (See paragraph 306).
3. Pilot Assignments for NASA Aircraft
  - a. The pilot-in-command (PIC) of any NASA aircraft will be a designated NASA pilot. Designated NASA pilots are those who perform piloting duties as a condition of NASA employment, to fulfill NASA contract requirements, or in accordance with an interagency agreement.

- b. Only pilots designated by NASA will be assigned piloting duties on passenger-carrying flights.
  - c. Demonstration, evaluation, or training flights involving non-NASA pilots will be documented and approved by the program manager and will be in support of a NASA program or project.
  - d. The PIC will ensure that appropriate passenger briefings are conducted and include pertinent egress, safety, and emergency information.
4. Documentation. Records pertaining to NASA-flight activities should include, as a minimum, the following:
- a. Approval of mission.
  - b. Name and duty status of all aboard.
  - c. Purpose of the flight.
  - d. Routing and/or flight events, and approximate take-off and landing times.

202. FLIGHT CREWS

NASA flight crews will be qualified in accordance with standards set forth in this Manual and individual Field Installation instructions. Qualification and flight evaluation records are required. A review of pilot and crew qualifications will be made prior to flight assignment to ensure that prerequisites for the intended mission are met.

1. Pilot Proficiency Evaluation Program. A comprehensive pilot proficiency evaluation program will be established at each Field Installation for pilots flying research and program support aircraft. This program should be specific to the assigned mission and reflect an in-depth evaluation of pilot proficiency and capability. Elements of the program should include:
- a. Procedures will be established to ensure that pilots obtain at least 100 flying hours per year. A portion of this time must include night flying and instrument flying to include instrument approaches. Procedures will be established to ensure that flying time, night flying, and instrument flying is achieved proportionally

throughout the year. Centers may impose additional proficiency requirements on flight crews to meet mission needs.

- b. Pilots, as a minimum, will have their flying proficiency evaluated annually by a NASA or NASA-designated pilot who is an instructor pilot/flight examiner in the aircraft used for the evaluation.
- c. Additionally, pilot instrument flying proficiency will be evaluated annually. This check may be combined with the proficiency check or completed separately.
- d. The use of simulation for supplemental training is encouraged where appropriate simulators are available. Realistic, mission-oriented scenarios may be used to complement the annual proficiency and instrument check requirements.
- e. Written tests will be administered or reviewed annually to ensure current pilot knowledge of air traffic control procedures, aircraft/back-up systems, normal/emergency procedures, Agency and local instructions, etc. The tests will be developed at each Center, administered and graded under the supervision of the Field Installation supervisor of aircraft operations, and the results recorded. Tests may be open or closed book, or a combination of both.
- f. Procedures will be established to ensure that pilot flight evaluation documentation is reviewed by a supervisory aircraft operations official. Flight evaluations of supervisory pilots will be reviewed by the Field Installation Aviation Safety Officer or training officer to confirm the appropriateness of the evaluation procedures. These evaluations will be forwarded through line management to the appropriate level for review and concurrence.
- g. Evaluation of mission management aircraft pilots will comply with the provisions of NHB 7900.3, (V-2) "Mission Management Aircraft Operations Manual."

## 2. Aviation Medical Program

- a. All aerospace research and research-support pilots will be medically certified at least annually.

Details of the requirements are listed in Appendix A, Aviation Medical Program.

- b. Copies of current medical certification will be kept on file at the pilot's operating site.
  - c. On a voluntary basis, a copy of the medical examination report may be forwarded to the Johnson Space Center (JSC) Flight Medicine Clinic for longitudinal review by the Aerospace Medicine Board.
  - d. Procedures will be established for an Agency medical review of the medical examination results for those pilots who do not meet the required standards.
  - e. The establishment of flight crew health maintenance programs is encouraged. These would include a prevention program, health risk analysis, and consultations.
  - f. Pilots of mission management aircraft will comply with the requirements of NHB 7900.3 (V-2) "Mission Management Aircraft Operations Manual."
3. Alcohol and Drugs. Each Center will develop a policy for personnel acting as crewmembers on NASA aircraft that is at least as restrictive as FAR 91, "General Operating and Flight Rules" concerning the use of alcohol and drugs.
4. Pilot Release from Flight Status. Center management are encouraged to establish procedures, in coordination with their personnel office, to ensure that pilots will be assigned to duties not involving flying if they become medically disqualified or if they are unable to satisfactorily demonstrate flying performance. These occurrences will be documented to include statements of fact and rationale leading to disposition and final decision. The documentation will be reviewed by the Center Director or designee.

## CHAPTER 3 - MISSION MANAGEMENT AIRCRAFT OPERATIONS

### 300. PURPOSE

This Chapter establishes policy and procedures for management, utilization, operation, and control of NASA mission management aircraft in accordance with NMI 7900.2, NASA Aircraft Operations Management - Delegation of Authority and OMB Circular A-126, Improving the Management and Use of Government Aircraft. Further guidance is provided by NHB 7900.3 (V2), Mission Management Aircraft Operations Manual.

### 301. POLICY

1. Mission management aircraft are used primarily to transport management and staff personnel to provide direction, coordination, and oversight in support of NASA's mission. When not otherwise scheduled, the aircraft may be used for the transportation of other personnel on official Government business when the itinerary, schedule, cost, or other factors make the use of these aircraft more advantageous to the Government than other methods of transportation.
2. Every effort will be made to minimize flights that are duplicative, require excessive deadheading, involve long, unproductive layovers, or involve short-stage lengths. Whenever practicable, intercenter airlift requirements will be combined.
3. Each person traveling aboard NASA mission management aircraft must be on official business and have either NASA travel authorization approved in accordance with NMI 9710.1 or travel authorization approved by another Federal agency or Congressional committee. Travel authorized by another Federal agency or Congressional committee must be approved by an Official-in-Charge of a Headquarters Office, a Director of a Field Installation, or his/her designee. In exceptional circumstances, when approved by the NASA Executive Officer, other persons may be permitted to travel aboard NASA mission management aircraft for emergency or humanitarian purposes or on a reimbursable basis.

### 302. APPROVAL OF FLIGHTS

A designated senior management official will ascertain that, prior to each flight approval, the purpose of the trip is for official business as described in paragraph 301.3., and one of the following criteria is satisfied:

1. No commercial aircraft or airline service is reasonably available to effectively fulfill the transportation requirement.
2. The variable cost of using mission management aircraft is not more than the cost of using commercial aircraft or airline service. The cost of using commercial aircraft or airline service includes, for example, the cost of any additional travel and employee's lost work-time.
3. The flight is being made to meet aircraft maintenance or aircrew training requirements.

303. MISSION MANAGEMENT AIRCRAFT RESPONSIBILITIES

1. The Associate Administrator for Management Systems and Facilities is responsible for approving policies and other matters not delegated below involving NASA mission management aircraft and for assuring the number of aircraft and their capacity to carry passengers and cargo do not exceed that required for mission purposes.
2. Institutional and Program Associate Administrators are responsible for:
  - a. Early coordination with the Office of Management Systems and Facilities in plans involving acquisition, assignment, or disposition of mission management aircraft.
  - b. Continually reviewing mission management aircraft requirements, use, and associated costs.
3. Installation Directors are responsible for the safe and efficient operation and utilization of assigned aircraft. They will assure that their aircraft functions, including contract functions, comply with NASA requirements established by instruction and handbook. Installation Directors should establish more restrictive standards when local conditions dictate and are responsible for:
  - a. Designating a senior management official who will be responsible for approving the use of Agency aircraft for mission management purposes.
  - b. Annually reviewing and documenting the Installation's continuing need for mission



management aircraft and the cost-effectiveness of aircraft operation, as reflected on the NASA Form 1085, Mission Management Aircraft Cost and Operations Report. Content of this review should include, in narrative format, a comparison of the past years' use with future requirements. Upon completion of the annual review, a copy should be forwarded to the Aircraft Management Office (Code JIF). When not fully justified, Installation Directors will identify such aircraft for reassignment or disposal, as appropriate.

4. The Chief, Aircraft Management Office, is responsible for:
  - a. Administering policy and guidelines for the management and use of mission management aircraft.
  - b. Developing and coordinating plans for the acquisition, assignment, and disposition of all mission management aircraft in accordance with applicable Federal guidelines.
  - c. Developing standard maintenance and operating procedures, including minimum training and qualification requirements for aircrew and maintenance personnel.
  - d. Convening periodic meetings with Field Installation Aircraft Operations Chiefs and Maintenance Chiefs to review and update operations and maintenance policies and procedures.
  - e. Working with subpanels of the IAOP (NMI 1152.47) in establishing airworthiness review procedures for all mission management aircraft.
  - f. Reviewing and approving modifications or alterations to mission management aircraft.
  - g. Conducting operational reviews to ensure the adequacy and standardization of procedures, aircrew training and qualification programs, and aircraft maintenance and inspection programs at Installations operating mission management aircraft.
  - h. Evaluating cost and utilization data for mission management aircraft and for providing a periodic summary analysis of all administrative cost and

utilization data to the Associate Administrator for Management Systems and Facilities.

- i. Providing Field Installations with guidance and average variable cost data for use in accomplishing cost comparisons when required by paragraph 302.2.
5. The Intercenter Aircraft Operations Panel (IAOP) is established by NMI 1152.47 and is composed of members from Field Installations that operate aircraft, representatives from the Aircraft Management Office, advisors from appropriate Field Installations and the Office of Safety and Mission Quality, and points of contact from the Headquarters Program Offices. This paragraph outlines the specific responsibilities of the IAOP Chairperson as they apply to mission management aircraft operations.
- a. For each type mission management aircraft, the Chairperson will establish Operations and Maintenance Subpanels with responsibility for standardizing aircrew and maintenance procedures, for establishing aircrew and maintenance training/qualification standards, and for conducting airworthiness reviews.
  - b. Subpanel membership will be composed of appropriate Chiefs of Aircraft Operations and Chiefs of Aircraft Maintenance or their designees, as well as a representative from the NASA Headquarters Aircraft Management Office who will act as permanent Executive Secretary.
  - c. Subpanels will be convened in formal meetings at least annually; however, the subpanels will act as standing committees subject to call by the Chairperson or the Executive Secretary to review urgent business. Informal meetings may be conducted telephonically.
  - d. Subpanels, with Chairperson concurrence, will forward their recommendations to the Aircraft Management Office, NASA Headquarters, for final approval. Headquarters approved recommendations will be considered directive in nature.

304. COORDINATION AND SCHEDULING

The designated senior management official at NASA Installations and at NASA Headquarters, in addition to approving the use of mission management aircraft, will:

1. Assure the most cost-effective aircraft is used to satisfy approved requirements. Exceptions to this usage will be documented in writing.
2. Coordinate planned trip itineraries and requirements with other NASA activities that could benefit from the use of available seats on each trip.
3. Assure trip documentation is maintained on file for a period of at least 24 months.

305. OPERATIONS

1. NASA mission management aircraft are public aircraft as defined by the Federal Aviation Act of 1958. Basic operating procedures and standards are contained in NHB 7900.3 (V-2).
2. Airworthiness of NASA mission management aircraft will, as a minimum, meet the standards set forth in the Federal Aviation Regulations for similar business type aircraft. Mission management aircraft will be maintained as required for retention of Federal Aviation Administration airworthiness certification.
3. The cost of operation and the utilization of mission management aircraft will be reported annually on the Mission Management Aircraft Cost and Operations Report (NASA Form 1085) in accordance with Financial Management Manual 9353-6 (RCS-10-0000-00271).

306. USE OF PROGRAM SUPPORT AIRCRAFT FOR MISSION MANAGEMENT PURPOSES

1. Program support entails direct support of NASA programs and projects, while mission management purposes are transport of management and staff personnel to provide direction, coordination, and oversight in support of NASA's mission.
2. The use of program support aircraft for such mission management purposes is not explicitly prohibited by NASA regulations; however, Agency policy has always been, and continues to be, that such use shall be restricted to exceptional circumstances. To ensure a

consistent approach is taken across the Agency on this matter, the following guidelines shall govern use of program support aircraft for mission management purposes.

3. The general policy is that program support aircraft will not be used for mission management purposes. This policy may be deviated from on an exception basis once all of the following requirements have been addressed.
  - a. Such use shall not conflict with regular program support functions.
  - b. Use only when mission management aircraft are not readily available or when such use would be impractical, e.g., using an available mission management aircraft would create excessive deadheading or would exceed crew duty restrictions.
  - c. Subject such usage to the same cost comparisons required for mission management aircraft flights per paragraph 302, unless the usage is an "add on" to a previously scheduled program support flight, such as a returning flight which would otherwise have empty seats.
  - d. Use only with the approval of the Center Director.
  - e. Document the justification for and approval of each use and retain the documentation for 2 years. Submit a summary report of such usage to the Office of Management Systems and Facilities semi-annually.
  - f. The Office of Management Systems and Facilities must approve and control the number of program support aircraft used.

CHAPTER 4 - AIRWORTHINESS AND SAFETY/FLIGHT  
READINESS REVIEW POLICY

400. PURPOSE

This Chapter establishes policy guidelines to ensure the airworthiness and appropriate maintenance of NASA aircraft. It also establishes guidelines for having safety/flight readiness reviews for the acceptance or modification of aircraft.

401. DEFINITIONS

1. Aircraft - All NASA controlled aircraft (see paragraph 102.b.), regardless of source or ownership, that are operated by or for NASA, or involve NASA personnel on official duty.
2. Aircraft Modification - Any alteration, addition, or removal of aircraft structure, components, equipment, computer software, or primary instrumentation. Routine maintenance is excepted from this definition.
3. Airworthiness - The capability of an aircraft to be operated within a prescribed flight envelope in a safe manner.
4. Flight Envelope - Aircraft performance limits or limitations approved by the aircraft manufacturer, DOD, Federal Aviation Administration (FAA), or established by a formal NASA airworthiness review or by a supervisory operations official.
5. Hazard Analysis - The technique used to systematically identify, evaluate, resolve, and assess hazards.
6. Mission - Any aircraft flight other than routine pilot proficiency, aircraft maintenance, or logistics flight.

402. POLICY

It is NASA policy to maintain airworthy aircraft and to conduct airworthiness and safety/flight readiness reviews for all aircraft significant modifications, and for establishing procedures to conduct flight operations and missions. The purpose of these reviews shall be to minimize risk to persons and property, enhance the likelihood of mission and program success, and to ensure there is adequate justification for all missions or

operations. Formal review requirements will be commensurate with the significance of the mission/project and the risk involved.

403. AIRWORTHINESS RESPONSIBILITIES

1. The Program Associate Administrators are responsible for establishing and reviewing the approved programmatic requirements.
2. The Associate Administrator for Safety and Mission Quality provides independent oversight of NASA aviation safety.
3. The Installation Directors are responsible for establishing airworthiness and safety/flight readiness review procedures to ensure safe aircraft operations, for ensuring that flight objectives satisfy the programmatic requirements, and that these requirements are incorporated into contracts of those who operate and maintain NASA-controlled aircraft.
4. The Aircraft Management Office is responsible for establishing airworthiness and safety/flight readiness review guidelines and working with subpanels of the IAOP for establishing airworthiness review and standard operating procedures for all mission management aircraft.

404. AIRWORTHINESS AND SAFETY/FLIGHT READINESS REVIEWS

Procedures will be established to ensure that airworthiness and safety reviews are conducted for aircraft operations or missions as applicable. Procedures will be established to ensure the conduct and documentation of formal airworthiness and safety/flight readiness reviews of significant aircraft modifications and flight programs. Uniformity of procedures is neither appropriate nor required in view of the diverse nature of aircraft operations within NASA. The following fundamental elements and functions are an integral part to NASA aircraft airworthiness and safety/flight readiness review programs and those that are appropriate must be included in policies and procedures that cover flight or flight-test operations.

1. Flight programs will be reviewed as early in the development cycle as possible and will identify the need and schedule for additional safety related resources, procedures, or reviews.

2. Establish and officially publish a recognizable procedure (e.g., organization, review board, committee) specifically for airworthiness and safety/flight reviews that will function independent of line management. This review procedure will use a multidisciplinary systems-type approach, including the appropriate hazard analysis and assessment of the safety risks. These reviews are to be formally conducted and documented.
3. All aircraft flight projects or missions will be subject to the airworthiness and safety/flight review process. However, only major projects will require the complete process. Field Installations may determine those projects or missions that require a full review by the organization outlined in paragraph 404.2. above. Normally a research flight program is reviewed/approved in total and then implemented using individual flight test plans that receive their own review/approval.
4. The qualifications of available personnel involved in a particular project/program will be reviewed and any special training needs or requirements established and implemented as appropriate.
5. Procedures will be established to ensure that airworthiness reviews are conducted for aircraft modifications with appropriate aircraft configuration control management. The review procedure will be similar to that established for airworthiness and safety/flight reviews outlined in subparagraph b. Modifications to aircraft on which FAA certification is to be maintained will be in accordance with the appropriate FAA regulations.
6. Procedures will be established to ensure that after the modifications are completed that the configuration changes are documented to ensure proper aircraft inventory for property management and for weight and balance records.

405. AIRWORTHINESS AND MAINTENANCE PROGRAMS

NASA aircraft will be maintained in accordance with an established and documented airworthiness program, using standards of quality in workmanship, materials, and support equipment, which will ensure safety of flight.

1. All NASA aircraft, aircraft supporting NASA, and aircraft using NASA flight crews will be under an approved airworthiness program using standards of quality in materials, workmanship, and supporting ground equipment, which ensure safety of flight. These standards will comply, at least, with the minimum standards set by the FAA, manufacturer, or DOD, as applicable.
2. NASA aircraft maintenance and quality assurance inspection programs should address, as a minimum, and as applicable, the following activities:
  - a. Inspection systems: calendar; periodic; phase; preflight and postflight inspections; and provisions for inspection and certification procedures of specific maintenance actions.
  - b. Determination of the serviceability of parts, components, accessories, and assemblies by subjecting them to inspections, tests, or operational checks.
  - c. An accounting and implementing system to ensure compliance with applicable airworthiness, service and safety bulletins, or other pertinent directives.
  - d. Program for trend analysis and investigation of recurring discrepancies, high-failure rate components, and high-usage materials.
  - e. Documentation system consisting of aircraft records (logs), accessory change records, weight and balance records, and aircraft property accountability records.

406. QUALITY ASSURANCE

Local procedures, standards, and documentation for quality assurance will be established.

407. MONITORING

Procedures will include monitoring of all local research and/or test flights (e.g., radio communications, radar, optics, chase aircraft, etc.).



408. MAINTENANCE MANUAL

Field Installation maintenance activities are encouraged to have a published maintenance manual containing guidelines for local practices and procedures. Appendix C has an outline suggested by the Maintenance Chiefs Subpanel for the contents of the Manual.



## CHAPTER 5 - AVIATION SAFETY

### 500. POLICY

1. NASA will take all practical and necessary steps to avoid the loss of life, personal injury, property loss, mission failure, or test failure. Accordingly, Field Installations will support and maintain a well-defined aviation safety program and organization in accordance with established guidelines. The aviation safety program will be formalized and implemented by safety professionals, who will provide timely monitoring, surveillance, and support. The safety program will address requirements of the aviation ground environment, flight environment, and programmatic mission environment.
2. Aviation safety is a line management responsibility. Consequently, managers at all levels have a direct responsibility for the safe conduct of aircraft operations under their control. All aviation safety-related contracts will require compliance with these guidelines.
3. This Chapter provides information concerning NASA's aviation safety program. Mishap prevention in NASA is based upon the philosophy that mishaps can be prevented and that mishap prevention is an inherent function of leadership and management. NASA's major involvement in aeronautics dictates a major involvement in aviation safety, not only under the aviation safety program, but under technology programs as well.

### 501. AVIATION SAFETY RESPONSIBILITIES

To ensure effective implementation, an aviation safety program shall conform to the organization's aviation management structure and is applicable Agencywide. To clarify the program, the NASA aviation management structure and safety responsibilities/functions are outlined below.

1. The Administrator is responsible for Agencywide safety.
2. The Associate Administrator for Safety and Mission Quality (SMO) establishes aviation safety program requirements, and provides independent oversight of NASA aviation safety. He/she shall provide the NASA Administrator an independent assessment of NASA's

aviation safety status and provide immediate information on critical safety issues. The Office is also responsible for a system assurance program that provides focus to those activities that will enhance operational success of NASA programs and/or projects. They will ensure that SMQ policies, plans, procedures, and standards are established, documented, maintained, communicated, and implemented. They will review safety practices and standards and their application to programs/projects and will conduct independent reviews of programs and programmatic controls within NASA and within the contractor structure. They will ensure the prompt, thorough, and accurate reporting, investigation, and analysis of all NASA mishaps.

3. The Director, Safety Division, is the Headquarters focal point for aviation safety oversight.
  - a. He/she provides overall aviation safety oversight and NASA Headquarters management support for aviation safety. Through this independent oversight function, the Director shall ensure that aviation safety program elements are being applied at the appropriate levels of responsibility throughout NASA.
  - b. The Director shall provide aviation safety oversight and support through the following functions:
    - (1) Providing systems safety oversight to ensure Headquarters and Field Installation aircraft operations comply with NASA safety policy.
    - (2) Coordinating all Safety and Mission Quality (Code Q) requirements affecting aviation safety or reporting.
    - (3) Ensuring there is an effective Agency mishap and incident reporting and corrective action system.
    - (4) Identifying aviation safety issues through mishap analysis.
    - (5) Assigning an Aviation Safety Officer (ASO) ex-officio board member to major aircraft mishap investigations.
    - (6) Participation in the Aircraft Management Office's (AMO) annual NASA ASO meeting.

- (7) Attending selected program flight readiness and safety reviews.
  - (8) Providing an advisor to the IAOP who shall participate in IAOP activities, including the IAOP meetings, reviews, and subpanel activities.
  - (9) Monitoring and acting on the aviation safety needs of the Headquarters Program Offices, AMO, and Field Installations.
  - (10) Providing an ASO to be the Agency independent focal point for aviation safety issues.
  - (11) Conducting aviation safety staff visits and reviews.
  - (12) Coordinating recommendations from mishap investigations that require corrective action from sources or agencies outside of NASA.
  - (13) Interfacing with other safety organizations.
  - (14) Advocating aviation safety research.
4. The Associate Administrator for Management Systems and Facilities in accordance with NMI 7900.1, is responsible for Agencywide policies and other matters related to NASA aircraft management. He/she will provide direction to the AMO in their coordinating role with NASA Field Installations and the IAOP.
5. The Aircraft Management Office (AMO) is responsible for establishing an Agencywide Aviation Safety Program in accordance with Agency policies. They will work with the IAOP, the Safety Division, and relevant Headquarters Program Offices to ensure that aviation safety program elements are developed and promulgated. The Chief, AMO, is the Headquarters focal point for Agencywide aircraft operations and management. The AMO will ensure NASA-wide compliance with the aviation safety program by meeting the following requirements/functions as appropriate:
- a. Designating an ASO within the AMO to assist in integrating safety into all activities.

- b. Establishing NASA Aviation Safety Policy guidelines for research and development, program support, and mission management aircraft operations.
  - c. Including the assessment of aviation safety programs in coordinating and managing the periodic intercenter aircraft operations reviews of NASA Field Installations. The results of the reviews are briefed to the head of the appropriate Headquarters office, and the final report is co-signed by the Manager, Flight Safety.
  - d. Conducting an annual NASA ASO meeting to ensure integration of safety into NASA aircraft operations policies and procedures.
  - e. Providing guidance on the operational safety aspects of NASA aircraft acquisitions.
  - f. Attending selected program flight readiness and safety reviews.
  - g. Participating in selected flight operations and related activities.
  - h. Interfacing with other aviation safety organizations.
  - i. Participating in selected investigations of aircraft mishaps.
  - j. Ensuring that recommendations and lessons learned from mishap investigations that have NASA-wide implications are coordinated and implemented.
6. The Program Offices with aircraft assets have line management responsibility for aviation safety and will ensure implementation of aviation safety programs for their respective Field Installations. This responsibility applies to allocation of aviation resources to meet objectives and program goals safely, promulgate safety awareness, conduct mishap investigations, and develop corrective actions.
- a. The Associate Administrators for Space Science and Applications (Code S); Aeronautics and Space Technology (Code R); Space Flight (Code M); and Management Systems and Facilities (Code J) have line management responsibility for aviation safety for their respective Field Installations or flight

to a higher level of management as may be necessary. If possible, the ASO position should be a full-time responsibility, even though at most Field Installations the ASO also performs primary pilot duties. Since the ASO serves as the manager's focal point for aviation safety matters, the ASO should report directly to the senior aviation manager responsible for risk management. The ASO also acts on behalf of the Installation Director when discharging this responsibility. The ASO shall foster aviation safety measures and use all resources available to promote mishap prevention. ASO selection should be based on education, experience, and ability. This individual will be on flight status, current in assigned aircraft, and ideally should be a graduate of an approved aviation safety program, and have experience in aircraft mishap investigation.

2. The ASO will have a sufficiently adequate background in aviation and familiarity with the Field Installation and its aviation programs in order to implement and promote an effective safety program.
3. The ASO should attend a recognized aviation safety officer's or accident prevention course of at least two weeks duration, and should establish a continuing education program to ensure adequate knowledge to discharge the duties of the office.

503. AVIATION SAFETY PROGRAM

1. An aviation safety program is similar in concept to military and other successful aviation safety programs where each level of aviation management (or command) is responsible for the program. Under this concept, the Director/Aviation Manager responsible for aviation safety and risk management at each level is assisted by an ASO or safety advisor who is an integral part of the manager's staff and not part of a separate safety organization. The program is supported by system safety personnel as required. Reviews and staff visits by Headquarters safety personnel provide oversight and monitoring of management's effectiveness in aviation safety, and technical and operational assistance for improving the overall safety programs.
2. The highly diversified aviation activities within NASA require a tailored aviation safety program for each flight activity. Although aviation safety is everyone's business, the primary responsibility for each Field Installation's aviation safety program

rests firmly with the Center Director. In the case of the NASA Headquarters aviation operations, the primary responsibility for the aviation safety program rests firmly with the Associate Administrator for Management Systems and Facilities.

3. Each Field Installation will establish a documented aviation safety program. Appendix B lists several proven elements that could be included in a program. However, Field Installation aviation safety programs will, as a minimum, address the following areas:
  - a. Risk assessment/hazard analysis.
  - b. Mishap and near mid-air collision reporting and investigation.
  - c. Project/program safety plans.
  - d. Design reviews, aircraft configuration management, and flight and test readiness reviews.
  - e. Training, education, and awareness.
  - f. Aviation safety inspections/surveys.
  - g. Hazard reporting and investigation.

#### 504. INTERFACES WITH OTHER AGENCIES

NASA aviation activities interface with the aircraft industry, Department of Transportation (DOT), Federal Aviation Administration (FAA), the Department of Defense (DOD), and foreign governments. These resources shall be used fully in aviation safety matters.

1. Industry. Although this interface is normally through the contracting officer, special safety provisions in contracts should permit or require exchange of accident information concerning the types of aircraft involved. Safety personnel should participate in design reviews and inspections during the acquisition phase to ensure proper safety coverage.
2. Department of Transportation. NASA aviation safety has a direct interest in FAA flight services and facilities used by NASA aircraft. These include departure, enroute, and arrival procedures, and the airways, restricted airspace, and local flying/training areas. Cooperation with FAA at the local level should foster a mutual understanding in



developing safe aviation control procedures. Research and development activities present a real opportunity for NASA/FAA cooperation to enhance safety.

3. Department of Defense. Since NASA utilizes many military airfields and aircraft common to the military services, coordination with the Army, Navy, and Air Force is required. Use of the various service safety publications, cross-exchange of accident prevention data, and participation in joint safety efforts should provide mutual benefits. Safety and accident investigation provisions are included in joint agreements with DOD agencies for joint use or loan of aircraft.
4. Foreign Governments. Most foreign interface occurs during joint research of exchange programs and aviation displays. Aviation safety is keyed to saving lives and property and should not have political or national boundaries.



## CHAPTER 6 - INTERCENTER AIRCRAFT OPERATIONS REVIEW PROGRAM

### 600. PURPOSE

The purpose of the NASA intercenter aircraft operations review program is to provide an objective management evaluation of the procedures and practices that are being used at the operating Centers to ensure safe and efficient accomplishment of assigned missions and goals. In addition to providing Center Directors and Headquarters management officials with an overview of the general health of all aspects of our aircraft operations, the review teams will also identify deficiencies in, or deviations from, NASA-wide policies and guidelines. Results of the reviews will be used to update these policies and instructions in order to enhance standardization and improve productivity. Since these evaluations are conducted by primarily intercenter team members, they also provide a cross-feed of current information among Centers. (See Appendix C for team report form, Appendix D for review plan, and Appendix E for review checklist).

### 601. RESPONSIBILITIES

The review program is managed by the AMO and supported by the IAOP. The IAOP will support the AMO in establishing review teams to periodically review all aspects of aircraft operations at NASA Centers, including the implementation of Center procedures.

### 602. PROCEDURES

In conducting reviews, the following guidelines will be used:

1. The review team will be composed of a team leader who is a member of the IAOP and four or five team members selected from various Centers to provide expertise in the areas of operations, maintenance, quality assurance, avionics, and aviation safety. The mix of Center members will vary from review to review. The AMO will provide a member for each review who will be responsible to review management practices and special interest items. In addition, the Office of Safety and Mission Quality will provide a member for each review who will be responsible for aviation safety compliance. The Aerospace Safety Advisory Panel may send an observer to each review. The AMO will maintain a current review schedule.

2. A letter will be written to the appropriate Center Director and cognizant Headquarters Program Office listing the scope and time of the review and requesting a briefing on the Center's aircraft operations program. This letter is the responsibility of the AMO.
3. Depending on the level of flight activity at a Field Installation, the reviews should be completed within a period of 2 to 4 days. The team leader will ensure that sufficient time is spent at the site for a thorough review.
4. All reviews will start with a team entrance briefing and conclude with an exit debriefing between the review team and the Center Director or his designee. The team leader should introduce the team members and explain the scope and purpose of the review at the entrance briefing.
5. The Field Installation in-briefing for the review team should be comprehensive. Local operations and maintenance documents should be made available to the team and the team members should familiarize themselves with the documents before performing field work.
6. Standards for the review will continue to be those that ensure compliance with established instructions. They include FAA, DOD, manufacturer's, industry, and association standards as applicable to NASA aircraft operations.
7. Review checklists will be made available to each review team member to use as a guideline to ensure compliance with applicable instructions. Team members should discuss findings and recommendations with the impacted Field Installation party to ensure mutual understanding of the observations. Minor discrepancy items should be brought to the attention of the first line supervisor for immediate corrective action. The team leader should hold daily team progress meetings to discuss discrepancies and possible recommendations.
8. The team leader out-briefing should be in sufficient detail to inform Center management of the status of local aircraft operations activities with particular emphasis on significant findings and recommendations requiring management attention.

9. Reviews will be documented in a brief report which focuses on significant findings and recommendations. The review report should address those items that require senior management attention and also should identify those activities that are being performed in an outstanding manner. Criticality criteria will be used to assist management in prioritizing responses as follows; Required Action, Recommendation, and Commendable Finding. Required Actions will cite the specific rule not being complied with. The report will be forwarded by the review team leader to the cognizant Program Office. Copies will be sent to the cognizant Center Director, appropriate Headquarters offices, IAOP members, and members of the review team.
10. The Center Director will be responsible for responding to the appropriate Institutional Program Office concerning corrective actions. The Program Office will review the response and forward it to the AMO. The AMO will review and analyze the response for adequacy, follow up as necessary, track recommendation responses, and closeout the report.



## APPENDIX A

### AVIATION MEDICAL PROGRAM

The Aviation Medical Program is under development by the Director, Occupational Health Office, and will be included upon completion.





## APPENDIX B

### ELEMENTS OF AN AVIATION SAFETY PROGRAM

This Section discusses the general elements of an effective aviation safety program. Each Field Installation shall implement an aircraft mishap prevention program that includes the elements that are appropriate for their operation.

- A. Aircraft Mishap Prevention Survey. An aircraft mishap prevention survey informs the Aviation Manager of the effectiveness of the mishap prevention program. A properly conducted survey provides a vital management tool to identify potential hazards and isolate inadequate policies for elimination or correction. A NASA Headquarters aviation safety review of each Field Installation is required biannually. The AMO, with the assistance of the IAOP, conducts formal reviews biannually with independent safety oversight by the Headquarters Safety Division (Code QS) to meet this requirement. Installations should conduct internal surveys during the alternate year. These reviews will provide the manager with an objective evaluation of aircraft operations, maintenance, crew procedures, and facilities to ensure safe and efficient operation and aircraft usage consistent with assigned goals and Field Installation requirements.
- B. Aircraft Mishap Reporting and Investigation. The principle of mishap investigation and reporting is central to an effective aviation safety program and shall be in accordance with the current NMI 8621.1, and NHB 1700.1(V2).
- C. Monthly Mishap Prevention Themes. The monthly aircraft mishap prevention theme provides a means of scheduling pertinent and timely subjects for development and discussion. Recommended themes based on cause factors in recent mishaps. The theme selected should be stressed during that month and should be discussed, publicized, and posted on aviation bulletin boards.
- D. Aviation Mishap Prevention Bulletin Board
  1. Aviation mishap prevention bulletin boards should be established within all aviation operations. Bulletin boards should be located in areas where flight crews and mechanics will see them every day. These boards should present current, interesting, neatly displayed information, beneficial to aviation personnel and directly related to aviation safety and aircraft mishap prevention.

2. A safety poster is one of the best methods for relaying short safety messages to personnel. A prominently displayed poster has a greater and longer lasting impact than a written message. Posters should be replaced often, but retained for future use.

E. The Aviation Safety Council

1. Each Installation is encouraged to establish an Aviation Safety Council. The general duties of an Aviation Safety Council are to:
  - a. Promote mishap prevention at Field Installation level through the exchange of ideas, discussions, and reports of flight hazard or deficiencies noted. Resolve problems by management action.
  - b. Monitor and review the aircraft mishap prevention program.
2. This Council should meet at least twice a year. Minutes of these meetings should be retained by the Aviation Safety Officer.
3. Members of the Installation Aviation Safety Council should include, but are not limited to:
  - a. Senior Management
  - b. Aviation Manager
  - c. Field Installation Safety Manager
  - d. Aviation Safety Officer
  - e. Aviation Maintenance Supervisor
  - f. Field Installation Instructor Pilot/Flight Examiner
  - g. Fire Marshall
  - h. Crash Alert Chief
  - i. Flight Surgeon

F. Aviation Safety Meetings

1. Aviation safety meetings should be held regularly at least bi-monthly for all aviation personnel. The unit Aviation Safety Officer should establish the times and places and be responsible for the agenda and for conducting the meetings. The meetings should be held in an informal atmosphere.
2. Meetings should include open discussions and be conducted in an interesting and constructive manner using guest speakers, films, aircraft mishap reviews, etc. Meeting topics should be provocative and timely, subject to differences of opinion significant to the

mishap prevention program effort, and concerned with current Field Installation safety problems. Whenever possible, Field Installation aviation personnel should be asked to participate actively in the actual presentation.

G. Incentives and Awards. All aviation personnel desire both satisfaction and recognition for their achievements. Safe behavior should be recognized and rewarded. Rewarding good behavior is always better than punishing undesirable behavior. Properly used, incentives and awards can be extremely effective in both motivating and maintaining safe behavior. In developing a safety incentives and awards program, the following principles should be considered:

1. Individual awards are generally more effective than group awards. The monetary value of the award is relatively unimportant. Expensive awards may, in fact, foster competition and ill feeling that defeats the purpose of the program. The best award is the one that individuals can keep and display.
2. The manner in which the award is presented is as important as the award itself. The award should be presented publicly to effectively satisfy the individual's need for recognition and to provide incentives for other personnel.
3. Any awards program based on competition should be carefully developed to avoid a situation that circumvents the purpose of the accident prevention program. In one award program, it was found that on-the-job injuries were still occurring, but employees were not seeking medical attention so that their injuries would not be reported. This obviously was not the purpose of the program.
4. The awards program should include all aspects and functional areas of the aviation programs; i.e., operations, maintenance, training, flightline, etc. It is important that the awards program be part of the participating safety program and include everyone.

The safety program provides an opportunity for everyone to contribute to aviation safety. Individuals should be allowed to participate in developing the procedures for safe behavior, a solid safety program, and a safety incentive awards program. As a rule, people tend to accept their own procedures better than ones imposed upon them. Employee participation can be a strong motivating factor for safe behavior and can enhance the safety program.

- H. 1. Occupational Health, Medical Clearance, Emergency Egress, and Survival. Close coordination with occupational health and medical officers and aviation personal equipment specialists shall be maintained. This enhances protection of aircrew and passengers by ensuring proper medical clearances for flight duties; adequate training; and properly maintained and functioning emergency survival equipment. The proper care and use of parachutes, egress systems, breathing equipment, protective equipment, and survival gear are subjects for safety surveillance.
2. Updated egress and survival training shall be provided. This is particularly important when new equipment is received and when procedures are updated to new standards. Knowledge of egress capabilities at high speed and high altitudes, as well as low altitudes and high sink rate conditions, is of vital importance to operators of high performance as well as Vertical/Short Take-Off and Landing (V/STOL) aircraft. Training in passenger briefings is important for crews of mission support aircraft. The Aviation Safety Officer should assist in this type of training.
3. The aviation medical program and aviation life support equipment are important components of this safety program element.
- a. The Aviation Medical Program. The objectives of the Program are to promote aviation safety and prevent illness and injury of aviators and aviation support personnel. Specific aims are to promote the health and safety of aviation personnel through appropriate preventive medicine practices; ensure a safe, toxic-free environment for aviation personnel; and evaluate personal equipment and the man/machine interface for toxic and hazardous conditions. Managers shall ensure establishment and support of an aviation medicine program tailored to specific needs of aviation personnel supported.
- b. Aviation Life Support Equipment (ALSE). ALSE is a vital link to a comprehensive aviation safety program. The responsibility, accountability, inspection, and maintenance of this equipment should be delegated to support personnel who are familiar with the equipment, experienced and knowledgeable in aviation concept, and aware of the need for ALSE. ALSE school attendance is desirable and encouraged. Duties of ALSE personnel include:

- (1) Issue and accountability of the correct life support equipment to suit the mission, aircraft, and environment.
- (2) Periodic inspections of ALSE to ensure equipment maintenance for maximum service life to each component.
- (3) Ordering and stocking parts and medical supplies to repair or replace unserviceable, suspended, or dated components.
- (4) Conducting continuing education program to ensure that all personnel transported on NASA aircraft are familiar with the use and capabilities of ALSE.
- (5) Ensuring all aviation personnel are trained and current in ALSE use, survival techniques, and first aid.

- I. Facilities. Adequate flight facilities shall be established and maintained. These include airfield, aircrew, maintenance, aircraft service life extension facilities, and crash, fire, rescue (CFR) facilities. If off-site operation is planned, emergency facilities shall be defined and provided.
- J. Cargo Safety. Provisions shall be made for the safe handling and stowing of cargo, including hazardous materials in NASA aircraft. Additionally, contract carriers and airlift services utilized by NASA are required to abide by sound safety practices and DOT regulations in the transportation of hazardous materials and cargo. Mixed cargo and passenger loads shall be monitored for safe practices by those responsible.
- K. Dissemination of Aviation Safety-Related Material. The best aviation safety material contributes very little to safety programs unless it is read or used by the people who are part of the aviation safety program. Aviation safety managers should ensure that aviation safety-related materials are distributed throughout their Field Installations and other sites. Safety information that would be of interest Agencywide should be sent to NASA Headquarters, Attn: Code QSO, Operational Safety, for distribution. This information may assist in saving lives and preserving valuable resources.

- L. Aviation Safety Officer (ASO) Handbook. Additional information on aviation safety is contained in the Aviation Safety Officer Handbook (currently under development).

## APPENDIX C

### GUIDELINES FOR FIELD INSTALLATION AIRCRAFT MAINTENANCE MANUALS

#### Intercenter Aircraft Operations Panel Maintenance Chiefs Subpanel

Each Field Installation should have an aircraft maintenance manual peculiar to that activity. The manual should define personnel duties and responsibilities and prescribe general requirements pertaining to maintenance, repair, modification, inspection, and related matters for assigned aircraft. The intent of the manual should be to provide guidance, not to cover every contingency that may arise or every rule of safety or good practice. Supplemental instructions should be issued, as necessary, and revisions made when required.

The following guidelines were developed by the Maintenance Chiefs Subpanel of the Intercenter Aircraft Operations Panel for Field Installation suggested use in formulating and implementing an aircraft maintenance manual. The guidelines present the minimum necessary to maintain NASA aircraft in a safe operational condition.

#### A. Introduction

1. Preface, Table of Contents
2. Written statement of purpose, organization, and sources of information.

#### B. Policy/Responsibilities and Authority

Outline levels of supervision, employee positions and responsibilities, and authority of each.

#### C. Qualification and Certification Requirements

1. Flight crew
2. Maintenance
3. Training
4. Certification/Qualification cycles

#### D. Inspection/Quality Assurance

1. System

2. Designated inspectors
  3. Certification
- E. Ground Handling of Aircraft
1. Taxiing
  2. Towing
  3. Arrivals/departures
  4. Engine run-ups and power-on checks
- F. Aircraft Maintenance
1. Contract maintenance
  2. Maintenance test flight procedures
  3. Inspection system(s)
  4. Reports and records
- G. Servicing/Cleaning/Corrosion Control
1. Fuel storage
  2. Safety requirements for refueling/grounding
  3. Contamination checks
  4. Off base refueling
  5. Oil service
  6. Oxygen service (lox/gas)
  7. Tire service
  8. Exterior/interior aircraft cleaning
  9. Corrosion control
- H. General
1. Flight request procedures
  2. Maintenance release procedures



3. Life support and personal equipment
4. Fire and evacuation procedures
5. Ground support equipment operation and procedures
6. Housekeeping
7. Maintenance of aircraft electrical, avionics, radio, navigation, radar, hydraulic, and pneumatic systems
8. Aircraft jacking procedures
9. Maintenance of landing gears, wheels, brakes, and tires
10. Aircraft configuration control



APPENDIX D

NASA INTERCENTER AIRCRAFT OPERATIONS REVIEW  
AIRCRAFT MANAGEMENT OFFICE

FACILITY:

DATE: \_\_\_\_\_

AREA REVIEWED:    MANAGEMENT \_\_\_\_\_    OPERATIONS \_\_\_\_\_  
                         SAFETY \_\_\_\_\_    AVIONICS \_\_\_\_\_    QA \_\_\_\_\_  
                         MAINTENANCE \_\_\_\_\_    FACILITIES \_\_\_\_\_

TEAM MEMBER:

LOCAL CONTACT:

OBSERVATION TITLE:

OBSERVATION (Factual Information):

REQUIRED ACTION, RECOMMENDATION, OR COMMENDABLE FINDING:



## APPENDIX E

### INTERCENTER AIRCRAFT OPERATIONS REVIEW PLAN

Action Item	Responsible Party	Timing
Update schedule, designate team leaders, and assign intercenter team members.	AMO	Yearly, amended as required.
Notify team members, request travel orders.	Team Leader	6-8 weeks before review.
Letter to Center Director.	AMO	4-6 weeks before review.
Team leader packet containing checklists and recent reviews.	AMO	4 weeks before review.
Entrance briefing.	Team Leader	First day of review.
Team briefing.	Applicable Center	First day of review.
Individual observations and recommendations.	Team member	During review.
Exit briefing.	Team Leader	Last day of review.
Write review report, forward to Code JIF	Team Leader/ AMO assist	2-4 weeks after review.
Forward report to Program Office for review and forwarding to Center Director.	JIF Signature/ IPO forward to Center Director	Within 1 week of receipt.
Center Director forwards review report response to IPO.	Applicable Center	4-6 weeks after receipt of report.
IPO reviews response and forwards to Code JIF.	IPO	1-2 weeks after response receipt.
Analyze response for adequacy, followup, tracking, and closeout.	AMO	As necessary.



APPENDIX F

AIRCRAFT MANAGEMENT OFFICE

INTERCENTER AIRCRAFT OPERATIONS REVIEW CHECKLIST

A. OPERATIONS

1. Organization/Management

- a. Is the flight operations organization at a sufficient level to function with strength and authority? Is staffing adequate?
- b. To whom does the Director of Flight Operations report?
- c. To whom does the Chief Pilot report?
- d. Where does the aircrew office fit into the organization?
- e. Does higher management communicate with and support the aircraft operations organization?
- f. Is there an internal review program in place? Does the organization look at itself periodically?

2. Aircrew/Operations

- a. How are persons authorized to be aircrew members?
- b. How are aircrew checked out in an aircraft? Who authorizes it? What documentation?
- c. What physical examination requirements exist?
- d. What physiological training requirements exist?
- e. What proficiency requirements exist?
- f. What are the flight time requirements?
- g. Are there limitations placed on the less experienced pilots? What limits? Who monitors? Are they written?
- h. What are the aircraft currency requirements?

- i. How is currency reestablished? Is it documented?
- j. Is there a pilot information file (PIF)?
- k. Are only authorized persons flying on board research flights? Who authorizes them to fly? What training is required of them? How are they authorized to fly? By letter?
- l. When are floatation devices required aboard the aircraft?
- m. How are flights monitored in real-time? What in-flight control exist?
- n. Are ultrahazardous flight activities conducted?
  - (1) How are they defined? ie., spins, flutter, high angle of attack.
  - (2) What special procedures are used?
    - (a) Multiple crew?
    - (b) Radar monitoring?
    - (c) Chase aircraft?
  - (3) What preparatory training has the aircrew had?
  - (4) Who reviews the procedures and pilot techniques to be used?
- o. Are flight activities conducted off-site?
  - (1) How are they approved?
  - (2) Who reviews deviations from normal operations?
  - (3) What contact is maintained with the home facility?
- p. Is tenant activity conducted at the home base?
  - (1) What agreements exist?
  - (2) Who is responsible for what?
  - (3) Is the Center briefed on daily tenant activity?



- (4) Does the Center have the authority to stop the tenant operations? On what basis?

3. Mission Management Aircraft (MMA) Operations

- a. Aircrew, check records and determine appropriate crew designation, proficiency, flight check, training, and crew duty compliance.
- b. Ground crew, check records and determine appropriate designation, training, and qualifications.
- c. Are directives and manuals current?
- d. Is the aircraft interior in good condition? Are passenger briefing cards onboard and being used?
- e. Is there appropriate management of the operation?
- f. Is a contractor involved? Is NASA-contractor interface appropriate? Who is the contract monitor?
- g. Are data provided for NASA Form 1085 submission adequate and accurate?

4. MMA Operations Requirements

MMA operations must comply with OMB Circular A-126 and NASA procedures. Ensure that procedures have been established to comply with information outlined below.

- a. A senior management official will ascertain that, prior to each flight approval, the purpose of the trip is official business and one of the following criteria is satisfied:
  - (1) No commercial aircraft or airline service is reasonably available to effectively fulfill the transportation requirement.
  - (2) The variable cost of using MMA is not more than the cost of using commercial aircraft or airline service. The cost....includes, for example, the cost of any additional travel and employee's lost work time.
  - (3) The flight is being made to meet aircraft maintenance or aircrew training requirements.

- b. Guidelines should be developed for determining when no commercial or airline service is reasonably available to fulfill the transportation requirement and require documentation of the criteria used for flight approval and the reason the criteria was satisfied. Where commercial or airline service is available, required documented cost comparisons must show the use of MMA is more economical.
  - c. Review procedures to ensure that these requirements are being appropriately addressed.
  - d. Check to see that the travel services contractor is apprised of available seats on MMA trips?
- 5. Use of Program Support Aircraft for Mission Management Purposes

General policy is that program support aircraft will not be used for mission management purposes. This will be deviated from on an exception basis once the following requirements have been addressed:

- a. Shall not conflict with regular program support functions.
  - b. Only when MMA not readily available or impractical, e.g., excessive deadheading, exceed crew duty restrictions.
  - c. Subject to the same cost comparisons as MMA per paragraph 3 above, unless an "add on."
  - d. Use only with the approval of the Center Director.
  - e. Document and retain the justification for and approval of each use; submit a report concerning such usage to Headquarters (Code J) quarterly.
  - f. Review procedures to ensure that these requirements are being appropriately addressed.
- 6. Training Files
  - a. Who manages aircraft operations training records?
  - b. Are the training records current?
  - c. How often are training records reviewed with the aircrew member?

d. Is there an established training program that includes; type, source, documentation, and recurrency for:

- (1) Egress.
- (2) Physiological.
- (3) Safety.
- (4) Aircraft specific.
- (5) Autorotation (helicopter only).
- (6) Emergency Procedures.
- (7) Water Survival Recurrency.
- (8) Other, MMA special requirements.

7. Life Support Equipment

- a. Is the facility adequate for the mission?
- b. Is ejection seat maintenance fully controlled and done in compliance with technical data?
- c. Are the types of personal and protective equipment on hand adequate and maintained in a useable fashion?
- d. Are records, including quality assurance inspection documentation, on hand?
- e. Is protective helmet maintenance and mask cleaning performed regularly?
- f. Is there adequate and proper survival gear?
- g. Are parachute repacking policies adequate?
- h. Visit altitude chamber, if applicable, and assess.

8. Documentation, Guidance, and Records

- a. What publications exist to guide normal and test operations?
- b. Are aircraft handbooks (Dash 1) available to each aircrew member?

- c. How are daily flights scheduled, approved, and recorded?
- d. Does a supervisor sign the flight clearance?
- e. Are minimums, restrictions, and local rules in writing?
- f. Is there a well-equipped flight planning facility available?
- g. Is there a manual that gives general operating instructions for Center aircraft; i.e., a flight operations manual? Does it cover all areas of flight; i.e., research, proficiency, and administrative aircraft?
- h. Is there an operations plan which provided procedures for operating aircraft; i.e., a basic operations plan? Does it include: an flight readiness review, a technical brief, a crew brief, a post-flight debrief?

9. General

- a. Are ground support facilities adequate?
  - (1) Hangar?
  - (2) Flight line and ramp?
  - (3) GSE?
  - (4) Taxiways?
  - (5) Refueling?
  - (6) Corrosion control, service life extension?
- b. Are aircraft properly serviced?
  - (1) Fuel?
  - (2) Oxygen?
- c. Who has the responsibility for the following tasks?
  - (1) Aircraft modification approval?
  - (2) Configuration control?

- (3) Approval of new procedures for test aircraft or systems?
- (4) Technical direction for maintenance, modification, and ground operations concerning the aircraft or its system?
- (5) Systems interface and integration?

10. Test Plans

Do test plans contain:

- a. Test conditions?
- b. Limits?
- c. Mission rules (mandatory conditions)?
- d. Abort rules, ground and air?
- e. Ground track?
- f. Support requirements?

11. Medical Program and Examination Records

- a. Ensure that there is a record documenting a current medical examination for each pilot in his/her aircraft operations records.
- b. Visit medical examination facility and ensure there is a medical program that may include preventive health and risk assessment for aircraft operations personnel.
- c. Are there adequate aircrew exercise facilities?

12. Pilot Release from Flight Status.

- a. Procedures should be established in coordination with the personnel office to ensure that pilots will be assigned other commensurate duties not involving flying if they become medically disqualified or are unable to satisfactorily demonstrate flying performance.
- b. Documentation should be reviewed by the Center Director.
- c. Check to see if procedures have been established.

B. AVIATION SAFETY

1. Aviation Safety Officer (ASO)
  - a. Is there a formally appointed ASO?
  - b. Are ASO duties well defined in writing?
  - c. Does the ASO have direct access to the Center or facility director?
  - d. Is the ASO involved in the design review process for cockpit modifications?
2. Aviation Safety Program
  - a. Is a program established? Is it published? Is it current?
  - b. Does the program include these elements:
    - (1) Risk assessment/hazard analysis.
    - (2) Mishap and near mid-air collision reporting and investigation.
    - (3) Project/program safety plans.
    - (4) Design reviews, aircraft configuration management, flight and test readiness reviews.
    - (5) Training, education, and awareness.
    - (6) Aviation safety inspections/surveys.
    - (7) Hazard reporting and investigation.
3. Publications

What safety publications are received? How are they distributed?
4. Mishap Reporting Procedures
  - a. Is there an existing mishap reporting plan or procedure established?
  - b. Is there a post-aviation-accident kit and checklist available? Are the contents of the kit adequate?
  - c. How are incidents reported?

- d. Who investigates incidents?
- e. What qualifications does the investigator have?
- 5. Safety Committees
  - a. Are there any safety committees in existence?
  - b. What is its composition and purpose?
  - c. Meetings? Minutes? Attendance?
- 6. Airborne Emergencies
  - a. How are airborne emergencies managed?
  - b. Do written emergency procedures exist? Are they followed?
- 7. Crash/Fire/Rescue (CFR)

Ensure that the CFR capabilities at the Field Installation operating site (and off-site) are adequate to cover normal and after duty hours flight operations. Visit CFR facilities.
- 8. Air Traffic Control

Ensure that air traffic control, approach control and monitoring, weather reporting, approach and runway lighting, navigational aids, and published approaches are adequate for assigned mission. Visit facilities.
- 9. Flight Data Recorders (FDR)

How many FDR's? On what aircraft? Any plans to acquire more?

C. FLIGHT READINESS

1. Flight Readiness Review (FRR) Procedures
  - a. Is there an FRR for every aircraft modification?  
How is the FRR established?
  - b. By whom? Who is on the board?
  - c. Is the board independent?
  - d. Does it cover every modification, however small?  
Every aircraft?
  - e. Are hazards identified? How are they resolved?
  - f. Is there a risk analysis? A risk assessment?
  - g. Is the FRR documented: procedures and results?
  - h. Does the FRR consider safety? Program success?
  - i. Is the mission justified in terms of the program goal?
  - j. Are individual flight test plans evaluated?
  - k. Are the program requirements established? By whom?
  - l. Are the qualifications of the personnel evaluated?
    - (1) Engineers.
    - (2) Technicians.
    - (3) Ground crew.
    - (4) Aircrew.
  - m. Is every discipline represented?
  - n. Is a systems type approach used?
  - o. What airworthiness standard is used to compare to the findings of the Board?
  - p. Are quality assurance standards and procedures identified and followed?
  - q. Are personnel training needs for the project identified and met?



2. Flight Envelope Determination
  - a. How is a flight envelope defined? How initially established?
  - b. Is it documented?
  - c. How is approval gained to expand it?
  - d. Are pilot procedures discussed before the flight?
  - e. How are critical flight parameters monitored? What communication with the pilot?
3. What procedures exist to control critical software?
4. Aircraft Modification
  - a. How is the modification process accomplished?
    - (1) Initial idea.
    - (2) Approval.
    - (3) Design.
    - (4) Construction guides.
    - (5) Installation guides.
    - (6) End-to-end checks done and documented.
    - (7) Flight test maneuvers and procedures.
  - b. What documents are generated? Are they adequate to tell the story?

D. HAZARD ANALYSIS

1. Is there a documented hazard identification program?
2. How is a hazard identified?
  - a. Actual.
  - b. Hypothetical.
3. Who keeps the log of the identified hazards?
4. How is the hazard analyzed?
5. How is the probability of occurrence determined?
6. How is the risk assessed?
7. Who decides whether to accept the risk?

E. FACILITIES

Visit all the facilities on-site to ensure that they are sufficient for the organization to effectively perform their assigned mission. The question to ask: Do the facilities enhance or hinder the operation?

1. Natural Hazards
  - a. Topographical: hills, cliffs, water.
  - b. Birds, animals.
  - c. Forests, trees.
2. Other Hazards
  - a. Airfields in close proximity.
  - b. Man-made: roads and taxiways, structures.
  - c. Conflicting traffic.
3. Base Facilities
  - a. Aircraft parking area.
  - b. Refueling area.
  - c. Hangars, shops.
  - d. Engine run-up area.
  - e. Taxiway.
  - f. Last chance inspection.
  - g. Runway.
  - h. Remote site operation.
  - i. Practice runways at home field and elsewhere.
  - j. Warning or restricted area use.
  - k. Support vehicles: cars, vans.
  - l. Tracking devices: telemetry, radio.
  - m. Offices: briefing rooms, pilot and passenger lounges.

#### 4. Construction and Renovation

Ensure that proposed renovations or new construction plans for aircraft operations related facilities are reviewed. Ensure that they are afforded appropriate priority in the report with regard to the Center's CoF budget.

F. AIRCRAFT MAINTENANCE

1. Organization

a. Review organizational charts, NASA and contractor as appropriate.

(1) Is the aircraft maintenance organization at an appropriate level to function with strength and authority?

(2) To whom does maintenance report? Does the organization receive adequate management support?

(3) Where does Quality Assurance/Inspection fit into the organization?

b. Is the organization appropriately manned to perform it's function?

2. Airworthiness

Aircraft Modifications.

a. What procedures are used to modify aircraft? Are modifications documented and tracked?

b. What standards are used?

c. Are the established policies, standards, and procedures followed?

3. Maintenance - Hangar and Flightline (NASA/Contractor)

a. Staffing.

(1) Are personnel responsibilities spelled out?

(2) Is authorized and on-hand staffing adequate?

b. Plan.

(1) Does the Center have an up-to-date maintenance plan?

(2) Are personnel familiar with the plan?

(3) Is the plan followed?

c. Flight Release Procedures.

- (1) Is there an established policy?
  - (2) Is the policy adequate?
  - (3) Are policy procedures followed?
- d. Equipment.  
What kind of condition (i.e., age, calibration, storage)?
- e. Certification.  
What is the policy for certifying aircraft mechanics, electronics, electricians, sheet metal, instrumentation, research technicians, and flight crew members?
- f. Safety Meetings/Equipment.  
What is the overall organizational policy for safety meetings and safety equipment? Is the policy followed?
- g. Corrosion Control.  
What policies and guidelines are used and are they followed?
- h. Supply Support.  
What problems, if any, exist in getting supplies/aircraft parts/contracts?
- 4. Mission Management Aircraft (MMA) Maintenance
  - a. Are all NASA and contractor MMA supervisors, project personnel, etc., FAA certified?
  - b. Are all MMA personnel aware of the requirements of NHB 7900.3 (V2)?

G. QUALITY ASSURANCE (QA) AND INSPECTION

1. Organization

- a. How is inspection/QA organized?
- b. Whom do they report to?
- c. How are inspectors/QA personnel selected?
- d. What authority does QA have?
- e. Are they independent from the maintenance organization?
- f. What are their guidelines? Are there published standards? Are they used?
- g. Do they perform or validate end-to-end checks of modified systems?
- h. How often does QA perform unannounced "spot" checks?
- i. Is there a deficiency reporting system and remedial action followup on substandard situations?

2. Inspection

- a. Is the inspection program established and followed?
- b. Does the Center have designated inspectors?
- c. Is the Designated Inspector program working satisfactorily?
- d. How are inspectors/QA personnel trained?
- e. Does the Center utilize the "stamp" system?
- f. Check documentation for inspector signatures/stamps records for accuracy.

3. Tasks

- a. Are inspections performed as scheduled? On time?
- b. Is the oil analysis program monitored for trends?
- c. Are procedures established for towing, taxiing, and runup? Are the personnel certified as qualified to do these tasks?

- d. Is equipment calibrated as required? Is test equipment available and well maintained?
- 4. Technical Data
  - a. Are the QA/inspection records properly stored?
  - b. Is the Technical Library, including technical orders, service manuals, service bulletins, instructions, and directives current; is it applicable to on-hand equipment; and is it readily available to the technicians?
  - c. What technical manual or general guideline is used to conduct everyday work practices and standards?
  - d. Is documentation maintained to reflect modifications incorporated on each aircraft?
  - e. Are weight and balance procedures correct?
- 5. Foreign Object Damage (FOD) Control Program
  - a. Is an FOD program established? Is it followed?
  - b. Is there an established tool control program? Is it being followed?



H. AVIONICS, INSTRUMENTATION, ELECTRONICS, AND ELECTRICAL

1. Organization and Personnel

- a. How is the Avionic Shop organized?
- b. Are there sufficient technicians to perform the assigned work?
- c. What training do personnel receive? Is the training adequate?
- d. Have personnel met the requirements of NHB 5300.4?

2. Areas of Responsibility

- a. Determine the areas and levels of work the shop is responsible for; such as avionic, electrical, and instrumentation.
- b. If involved in research equipment installations, to what extent and depth do avionic shop personnel participate?
- c. What approvals are required on experimental equipment and installations?

3. Equipment

- a. What system is used to calibrate equipment?
  - (1) How is frequency established?
  - (2) Is a "recall" method used?
  - (3) Are calibrations traceable to National Bureau of Standards?
  - (4) Who is responsible for documentation?
- b. Is the shop equipped with calibrated test equipment and tools? Are the tools and equipment properly tagged?

4. Technical Data

Is a current file of technical orders, manufacturer service manuals, instructions, service bulletins, etc., for equipment being maintained and is it accessible for personnel usage?

5. Inspection

What is the inspection system?

6. Documentation

- a. Who is the responsible person?
- b. Is an adequate file of calibration and maintenance records maintained?
- c. Can a time history of failures be established from information provided on maintenance records?
- d. Is documentation maintained to reflect modifications incorporated on avionics equipment?

7. Battery Maintenance Program for Nickel Cadmium Batteries and for applicable Lead-Acid Batteries

- a. Is work area clean and orderly?
- b. Is work area provided with proper lighting and ventilation?
- c. Is documentation maintained to reflect when inspections are due for each aircraft battery installation?
- d. Is safety protection equipment provided for personnel?
  - (1) Eye shield.
  - (2) Rubber apron.
  - (3) Eye wash and eye solution available.
  - (4) Rubber gloves.
- e. Are battery chargers maintained in good operational condition and meters calibrated at an established frequency?
- f. Is battery charger manual available for reference to operational procedures and problems?
- g. Are all batteries properly tagged as to condition?
- h. Are Nickel-Cadmium batteries strapped out when not stored in a charged condition?

- i. Are inspection procedures utilized when performing capacity checks and teardown of aircraft batteries?
- j. Is adequate storage area provided for replacement cells, segregated by part number?
- k. Do all NASA-owned aircraft have a battery temperature monitoring system installed and an established policy?
- l. What is the voltage regulator check frequency?

I. MAINTENANCE FACILITIES - Check with facility manager or safety representative

1. Does the maintenance work area have sufficient space to perform the assigned work?
2. Is the condition of work area hazard-free and clean?
3. Is work area environmentally controlled?
4. Is work area equipped with central fire protection system?
5. Is work area periodically inspected to assure compliance with safety regulations (i.e. fire bottle inspections, aircraft power outlets properly grounded, work benches grounded, etc.)
6. Is a facility and off-site security program in effect?
7. Is this a certified FAA repair station? If so, is the repair station manual current?

J. MAINTENANCE TRAINING

1. Is there an established maintenance training program that includes; type, source, documentation, and recurrency for the:
  - a. Technicians.
    - (1) Avionics.
    - (2) Mechanical.
    - (3) Instrumentation.
    - (4) Electronics.
    - (5) Electrical.
    - (6) Sheet metal.
  - b. Air crew members.
2. Training Files
  - a. Who manages maintenance training records?
  - b. Are the training records current?
  - c. How often are training records reviewed with the maintenance technician?

K. ACCIDENT INVESTIGATION RECOMMENDATIONS

1. NASA 712, Convair 990 Aircraft Accident Recommendations:
  - a. Establish guidelines requiring that only new tires or approved retreads be used on NASA aircraft.
  - b. Establish guidelines requiring that all occupants of NASA aircraft on research missions wear flight suits made from appropriate fire-retardant materials.
  - c. Establish procedures for rejected takeoffs that parallel accepted air carrier industry practices, with emphasis on the use of maximum wheel braking and control yoke management.
  - d. Review the practicality of using wheels with roll-on-rim capability on appropriate NASA aircraft and, if feasible, implement their use.
  - e. Develop guidelines to minimize the use of tires with different ply ratings or tires produced by different manufacturers on the same axle where differences in characteristics between such tires can affect tire loading under normal operating conditions.
  - f. Ensure that copies of pertinent aircraft operational and maintenance logs are retained at appropriate ground facilities.
  - g. Ensure that preflight inspection records contain the measured tire pressures.
  - h. Require that all NASA flightcrews monitor the controlling facility radio frequency or appropriate emergency frequency during takeoff.
2. NASA 714, T-38A Aircraft Accident Recommendations:
  - a. Consider the use of alternate fuels that are less volatile and less subject to ignition than JP-4.
  - b. Disseminate information and provide hands-on training to CFR personnel assigned to facilities where NASA aircraft operate routinely.
  - c. A program to ensure proficiency on ground egress through increased emphasis on procedural practice and training should be instituted.
  - d. Emphasis should continue to be placed on air crew emergency procedures.

## APPENDIX G

### NASA AVIATION RELATED DOCUMENTS

A consolidated list of NASA aviation related documents is provided below. Recommend that these documents be readily available at each Field Installation aviation operation.

- A. NMI 1103.39 Role and Responsibilities, Associate Administrator for Safety and Mission Quality.
- B. NMI 1152.47 NASA Intercenter Aircraft Operations Panel.
- C. NMI 1152.59 NASA Medical Boards in Support of Crew Qualification for Spacecraft and Aircraft Operations.
- D. NMI 1156.14 Aerospace Safety Advisory Panel.
- E. NMI 1382.2 Availability of Agency Records to Members of the Public.
- F. NMI 1382.3 Release of Mishap Investigation Reports to the Public.
- G. NMI 1382.4 Release of Information Concerning Mishaps and Casualties.
- H. NMI 7900.2 NASA Aircraft Operations Management -- Delegation of Authority.
- I. NMI 8621.1 Mishap Reporting and Investigating.
- J. NMI 9810.1 The NASA Investigations Program.
- K. NHB 1700.1(V1) Basic Safety Manual.
- L. NHB 1700.1(V2) Guidelines for Mishap Investigation.
- M. NHB 2710.1 Safety and Health Handbook - Occupational Safety and Health Programs.
- N. NHB 7900.3(V1) Aircraft Operations Management Manual.
- O. NHB 7900.3(V2) Mission Management Aircraft Operations Manual.
- P. Department of Defense - NASA Agreement for Joint Investigation of Aircraft or Space System Mishaps, December 9, 1982.

- Q. Occupational Safety and Health Act of 1970,  
Executive Order 12196, and 29 CFR, Part 1960  
and Part 1910.
- R. P.L. 90-67 Section 6 of the NASA Authorization Act, 1968  
(Public Law 90-67, Codified as 42 U.S.C.  
2477).



# APPENDIX H

## ACQUISITION CHECKLIST

A = Aircraft Management Office (AMO)  
P = Program Office  
C = Center Aircraft Operations Office

A	P	C	TASK
	X	X	<b>Establish basic requirements</b> The Program Office usually establishes the basic scientific requirement, from which is derived the requirement for an aircraft, either the research vehicle itself or as a platform to support research. The Center Aircraft Operations Office may also establish the need in order to meet secondary Program requirements or as a mission management vehicle.
	X	X	<b>Notify AMO of requirements and preferred aircraft</b> Give the AMO the basic requirement and whatever aircraft preferences you have based on other considerations. These data will be used for future aircraft acquisition planning and to begin an informal search depending on the immediacy of the requirement.
X			<b>Review and evaluate the request</b> The AMO will review the requirement and the suggested aircraft and either support the suggestion or recommend an alternative.
X		X	<b>Use informal network to locate suitable aircraft</b> The Center Aircraft Operations Offices should begin a search through informal contacts in the market, or at the DOD Command or unit level; the AMO will do the same at the Headquarters Service Branch levels to determine what is available. The priority for candidates is 1) from within NASA, 2) from within the government, and 3) outside sources.
X		X	<b>Coordinate with Center and Program Offices regarding potential candidate</b> The Center and the AMO coordinate with each other and the Program Offices when suitable aircraft are located.

	X	<p><b>Prepare letter addressed to Code J, through the Program Office requesting authority to acquire</b>  <b>Include:</b></p> <ul style="list-style-type: none"> <li>a. statement of need</li> <li>b. estimated acquisition cost</li> <li>c. estimated support cost</li> <li>d. proposed method of financing</li> <li>e. proposed method for logistics support</li> </ul>
X		<p><b>Prepare letter granting acquisition authority</b>  The AMO will prepare the letter granting the Center authority to acquire an aircraft.</p>
X		<p><b>Prepare concurrence package for other Headquarters Offices</b>  The AMO will prepare the concurrence package and distribute it for signature to the other Headquarters offices.</p>
	X	<p><b>Concur with Approval Authority</b>  The Program Office will review the package and approve or disapprove with comments.</p>
X	X	<p><b>Negotiate logistics support (via contract, or Memorandum of Understanding (MOU) w/DOD System Manager)</b>  The Center Aircraft Operations Office will negotiate with the DOD System Manager for that aircraft, with another government agency, or with a commercial contractor to establish the logistics support requirements and method of support prior to transfer (if possible). The AMO will support and assist this effort.</p>
X	X	<p><b>Prepare Draft Acquisition and Logistics Support Plan</b>  This plan should include the intended means of acquisition and the planned method by which the aircraft will be supported.</p>
X		<p><b>Coordinate loan/transfer agreement with appropriate DOD Command Headquarters and Center Aircraft Operations Office</b>  The AMO will coordinate the loan/transfer agreement with the appropriate DOD Command Headquarters Office in coordination with the Center Aircraft Operations Office. The agreement will be dependent on the support agreement negotiated by the Center.</p>

X			<p><b>Prepare MOU with DOD Service Organization Headquarters for loan/transfer and support</b></p> <p>This MOU will be the official result of the negotiations between the DOD Aircraft System Manager and the Center, and will be signed after transfer of the aircraft.</p>
X			<p><b>Coordinate MOU with Code J logistics office.</b></p>
X	X		<p><b>Acquire Aircraft</b></p> <p>For DOD or intra-government transfer, the AMO will prepare the necessary transfer messages, letters, etc. The Center Aircraft Operations Office and the Property Management Officer, in accordance with local procedures, will complete both the DD1149 and the SF122 and send them to the appropriate DOD and GSA offices with a copy to the AMO within 10 days. For commercial purchase, the Center will prepare the contract via the normal acquisition process and inform the AMO.</p>

